

CS 122A: Introduction to Data Management – Spring 2016, UC Irvine

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Homework 5: More SQL (Hands-On) (100 points)

1. [10 pts] For each Pilot, list his/her pid and duration of the maximum actual flight duration he/she has operated.

a) [7pts] SQL

```
SELECT      pid,      MAX(TIMESTAMPDIFF(SECOND,      actual_departure_datetime,
actual_arrival_datetime)) as maxduration
FROM Flight NATURAL JOIN Pilot_Operates_Flight
GROUP BY pid
```

b) [3pts] Results

pid	maxduration
990201	43320
990202	43320
990203	39720
990204	41520
990205	39720
990206	43320

2. [10 pts] For every Lounge, count the number of customers who have ordered from the lounge and have an American Express card. An American Express card is 15 digits long, while a Visa card is 16 digits long. Use function len() or length() to get the length of a string.

a) [7 pts] SQL

```
SELECT O.lid , COUNT(O.cid)
FROM DishOrder O , Credit_Card C
WHERE length(c.card_number) = 15 AND O.cid = C.cid
GROUP BY O.lid
```

b) [3 pts] Results

lid	cnt
212	2
213	1
314	1

3. [10 pts] Find ids of customers who have purchased from at least one lounge in every airport, and their total amount of all orders (for each customer) is above \$100.

a) [7 pts] SQL

```
SELECT C.cid
FROM (SELECT cid , sum(total_amount) as total_Orders_Amount
FROM Customer NATURAL JOIN DishOrder
GROUP BY cid) as C
WHERE C.total_Orders_Amount > 100 AND NOT EXISTS (SELECT IATA_code
FROM Airport
WHERE IATA_code NOT IN (SELECT DISTINCT IATA_code
FROM Airport A ,Lounge L, DishOrder O
WHERE A.IATA_code = L.airport_IATA_code AND L.lid = O.lid AND O.cid = C.cid))
```

b) [3 pts] Results

cid
1

4. [10 pts] Find Flights who have been fully booked, i.e., their total number of reservations is equal to its capacity.

a) [7 pts] SQL

```
SELECT R.flight_number , R.projected_departure_datetime
FROM (SELECT flight_number , projected_departure_datetime, SUM(quantity) as
reserved_seats
FROM Customer_Reserves_Flight
GROUP BY flight_number , projected_departure_datetime) AS R , Flight F , Airplane A
WHERE F.airplane_registration_number = A.registration_number AND F.flight_number =
R.flight_number AND F.projected_departure_datetime = R.projected_departure_datetime
AND A.capacity = R.reserved_seats
```

b) [3 pts] Results

flight_number	projected_departure_datetime
N124	10/7/2015 8:21:00
U987	7/7/2015 10:23:00

5. [10 pts] Currently, deleting a customer does not automatically delete the associated credit cards of the customer being deleted. Add a SQL constraint for the "Credit_card" table such

that if a customer is deleted, his/her credit cards are also deleted. (We only want the statement to add the constraint, and you don't need to repeat the original "CREATE TABLE" statement.)

```
ALTER TABLE Credit_card ADD FOREIGN KEY (cid) REFERENCES Customer(cid) ON DELETE CASCADE;
```

6. [15 pts] Write and execute a CREATE VIEW statement to create a view named Flights_offered_view that shows distinct flight numbers with their departure and destination airports. The view has the following schema:

Flights_offered_view (flight_number, departure_airport_IATA_code, arrival_airport_IATA_code).

```
CREATE VIEW Flights_offered_view (flight_number, departure_airport_IATA_code, arrival_airport_IATA_code) AS  
SELECT DISTINCT flight_number , departure_airport_IATA_code , arrival_airport_IATA_code  
FROM Flight
```

7. [5 pts] Can updates be performed on the view above? Justify your answer.

No, Because of the use of DISTINCT so the corresponding record(s) are unknown.

8. [10 pts] Write a SQL GRANT statement to give a user named "futurecustomer" read access (and only read access) to the Flights_offered_view. The user should also be allowed to give the same privilege to other users.

```
GRANT SELECT ON Flights_offered_view TO 'futurecustomer' WITH GRANT OPTION;
```

9. [10 pts] Create a trigger that will update the "total_amount" in the relation DishOrder whenever a dish, with its quantity, is added to that order. The trigger will increment "total_amount" by the amount "dish price * quantity". Make sure the trigger is executed when a new row is inserted in the relation DishOrder_Contains_Dish. Write CREATE TRIGGER statement between "DELIMITER \$\$" and "DELIMITER;".

```
DELIMITER $$
```

```
CREATE TRIGGER calucate_total_amount  
AFTER INSERT ON DishOrder_Contains_Dish  
FOR EACH ROW  
BEGIN  
UPDATE DishOrder
```

```
    SET total_amount = total_amount + NEW.quantity * (SELECT price FROM Dish WHERE
NEW.lid = lid AND NEW.name = name)
    WHERE oid = NEW.oid;
END$$
DELIMITER ;
```

10. [10 pts] Consider a relation scheme $R(M,N,L,P,Q,R,S)$ with the following functional dependencies: $M \rightarrow N$, $NL \rightarrow PQ$, $MQR \rightarrow S$. Prove $MLR \rightarrow PS$ is also true.

$ML \rightarrow NL$ (1)

$ML \rightarrow PQ$ (2)

$MLR \rightarrow PQR$ (3)

$MLR \rightarrow MLPQR$ (4)

$MLR \rightarrow MQR$ (5)

$MLR \rightarrow S$ (6)

$MLR \rightarrow P$ (7)

$MLR \rightarrow PS$ (8)